is more than 60° 45′ above the horizon the parhelia accompanying the halo of 22° are no longer formed.

In addition to the works previously mentioned valuable articles on halo phenomena will be found in the MONTHLY WEATHER REVIEW for 1897 on pages 294 and 305, and in the volume for 1902, page 317.

METEOROLOGICAL CHARTS OF THE INDIAN OCEAN.

By CHARLES FITZHUGH TALMAN, Section of Ocean Meteorology, U. S. Weather Bureau.

As one result of the recent transfer of the work in ocean meteorology from the Hydographic Office to the U. S. Weather Bureau, the latter becomes a cooperator in the important studies of the Indian Ocean and adjacent lands, recently undertaken on a large scale by the meteorological service of India. The general plan of this work was outlined by Sir John Eliot, in his notable address before the subsection of Cosmical Physics at the last meeting of the British Association.

The Indian Service published for several years daily synoptic charts of the Indian monsoon area, but the region covered by these charts extended only between 36° north and 12° south latitude. The observations upon which the charts were based were partly made at the shore stations, and partly obtained from meteorological logs of vessels. In view of the vast importance to India of a complete understanding of the conditions which control the monsoon winds and the resultant rainfall, it has been decided to extend the field of observation over the greater part of the Southern Indian Ocean, and also to include broad areas of the surrounding continents and islands.

In order to obtain as many observations as possible from the oceanic areas, and especially from the region of permanent high pressure in the ocean east of Cape Colony, the cooperation of the British, German, and American meteorological services has been requested. These three services are now engaged in securing marine observations from vessels of all nationalities throughout the world. As an indication of the probable number of reports to be furnished by the Weather Bureau, the statement of the Hydrographic Office as to the number of reports of trans-Indian voyages received during the period January 1, 1902, to January 1, 1904, is of interest. The number was 53, and the average time spent within the prescribed area was 51 days, making a total of 2700 observations in 720 days, or approximately four observations a day. To this number, the vessels reporting to the British and German meteorological services, together with those which report direct to the Indian Service, will be added, making up a very respectable total; so that the daily synoptic charts which the Indian Service is to prepare, commencing with January 1, 1905, are likely to present an interesting and valuable picture of the march of weather conditions over this region.

Sir John Eliot says:

> It has been found that the abnormal conditions of the past seven years, with their droughts in Australia, Africa, and India, have been associated with abnormal pressure conditions over a very large portion of the earth's surface; and it is hoped that these charts will enable light to be thrown on a number of questions of scientific interest as well as of economic importance.

The new enterprise of the Indian Meteorological Service appears to be an important step in the direction of "world meteorology," with successful long-range forecasting as its ultimate aim.

EARTHQUAKES OF JANUARY AND FEBRUARY, 1905.

By PROF. CHARLES F. MARVIN.

The following notes have reference to two slight earthquakes recorded by the Bosch Omori seismograph at the Weather Bureau in January and February of 1905.

The first, while definitely registered was of short duration and only a few of the characteristic features of such records were well developed. The second was a much stronger disturbance.

The detailed times of the usual features follow:

Earthquakes of January and February, 1905, seventy-fifth meridian time.

	January 20, 1905, (p. m.)			February 14, 1905, (a. m.)		
	h.	*m.*	*s.*	*h.*	*m.*	*s.*
First preliminary tremors began	1	6	37	4	14	10
Second preliminary tremors began	1	10	58	4	23	00
Principal portion began	1	14	38	4	31	21
Principal portion ended	1	20	32	4	35	36
End of earthquake	1	29	15	5	20	00
Duration of first preliminary tremors	4 min.	21 sec.		8 min.	50 sec.	
Duration of second preliminary tremors	3 "	40 "		8 "	21 "	
Duration of principal portion	5 "	54 "		4 "	15 "	
Total duration of earthquake	23 "	38 "	1 hr.	5 "	50 "	

Average period of definite waves, in preliminary portion	19.8 sec.
Average period of definite waves in principal portion	17.0 "
Period of pendulum	28.0 "
Maximum double amplitude of actual displacement of earth at seismograph	0.22 mm.
Magnification of record	10 times.

The earthquake of February 14 was preceded and followed by very perceptible pulsatory oscillations, by which are meant very slight oscillations that are visible throughout nearly the entire record and which have been noticed to occur from time to time without apparent close connection with other observed phenomena. These oscillations tend to render the determination of the times of beginning and ending of the feebler phases of the earthquake inexact.

DR. J. O. HARRIS.

By WILLIAM G. BURNS, Section Director, U. S. Weather Bureau.

Dr. J. O. Harris, an honored member of the staff of voluntary observers of the Climate and Crop Service of the Illinois Section, died at his home in Ottawa on the morning of January 10, aged 77 years. He was born at Liverpool, Onondaga County, New York, on September 13, 1828. He was a descendant of Revolutionary stock. A graduate in medicine, he entered the Army in 1862 as assistant surgeon of the 53d Illinois infantry. He was public-spirited and identified with every local enterprise. A man of high literary and scientific attainments, as early as 1854 he organized the public library, and his labors in the meteorological field date back to 1853, when he acted as correspondent for the Smithsonian Institution.

Since the organization of the Signal Service in 1870, Doctor Harris has served as voluntary observer, and his labors ceased only with his death.

RECENT PAPERS BEARING ON METEOROLOGY.

Mr. H. H. KIMBALL, Librarian and Climatologist.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——.

Nature. London. Vol. 71.

Robinson, Edward E. Super-cooled raindrops. P. 295.

—— Floods in the United States. P. 308.

MacDowall, Alex. B. The moon and the barometer. P. 320.

Knowledge. London. New Series. Vol. 2.

Clarke, Agnes M. Modern cosmogonies. XII. Our own system. Pp. 24–26.

—— The late Rev. J. M. Bacon. P. 31.

Lockyer, William J. S. Our sun and "weather." Pp. 33–35.